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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/471,332 12/23/99 HISADA

0 057368

EXAMINER

MMC1/0828

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2100 PENNSYLVANIA AVENUE NW
WASHINGTON DC 20037-3202

NORRIS, J

ART UNIT

PAPER NUMBER

2841

DATE MAILED:

08/28/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/471,332

Applicant(s)

HISADA ET AL.

Examiner

Jeremy Norris

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 13-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of group I, claims 1-12 in Paper No. 6 is acknowledged.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 5, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen et al (US 5,597,983).

Nguyen et al (hereafter Nguyen) disclose, referring to figure 5, a multilayer wiring substrate comprising: a first wiring conductor (20) with a recessed surface formed by etching a surface of the first wiring conductor, a first insulating layer (24) formed on a surface of the first wiring conductor except over the recess so that a first via-hole penetrates through the first insulating layer to the recessed surface; and a second insulating layer (22) formed on the other surface of the first wiring conductor [claim 1] further comprising a first via-conductor plated on an inner peripheral wall of the first via-hole and extendingly plated on the recessed surface of the first wiring conductor that forms a bottom of the via-hole; and a second wiring conductor formed on the first insulating layer and extendingly connecting with the first via-conductor (both referenced by character 30) [claims 2, 5], wherein the insulator comprises a material selected from

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the group consisting of resin, glass, ceramic and mixtures thereof (see col. 2, lines 25-40) [claim 8].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3, 4, 6, 7, and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen.

Regarding claims 3, 6, and 7, Nguyen discloses the claimed invention as described above except Nguyen does not specifically disclose a second layer [claims 3, 6] or further a third layer [claim 7] identical to the first layer. However, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to provide as many layers as is desired. The motivation for doing so would have been to transmit

more signals simultaneously. Furthermore, it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claim 4, Nguyen discloses, referring to figure 2, a multilayer wiring substrate comprising: a first wiring conductor (10) with a recessed surface formed by etching a surface of the first wiring conductor, a first insulating layer (14) formed on a surface of the first wiring conductor except over the recess so that a first via-hole penetrates through the first insulating layer to the recessed surface; and a second insulating layer (12) formed on the other surface of the first wiring conductor. Nguyen does not specifically disclose a solder bump adhering to the recessed surface of the first wiring conductor and formed in the first via-hole. However, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to place a solder bump in the via. Nguyen teaches that components are to be connected to the via (see col. 2, 60-65). One having ordinary skill in the art would know that solder bumps are a well know way of connecting components to boards. The motivation for doing so would have been to electrically and mechanically secure the component to the board.

Regarding claims 9 and 12, Nguyen discloses the claimed invention as described above except Nguyen does not specifically disclose the material of the conductor. However, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to comprise the conductor of gold, nickel, copper or mixtures thereof. The motivation for doing so would have been the highly conductive nature of the aforementioned materials. Moreover, it has been held to be within the general skill of a

worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claim 10, Nguyen discloses the claimed invention as described above except Nguyen does not specifically disclose the via hole to penetrate at least two insulating layers. However, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to have the via penetrate multiple insulating layers. The motivation for doing so would have been to access a deeper conductor layer in a multilayered board.

Regarding claim 11, Nguyen discloses the claimed invention as described above except Nguyen does not specifically disclose the depth of the recess to be 5-30 % of the thickness of the wiring conductor. However, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to find the proper depth for the hole. The motivation for doing so would have been to avoid removing so much material that the conductor was no longer functional. Moreover, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following documents disclose conductors with recessed surfaces:

US 5,321,211 Haslam et al.,

US 5,638,598 Nakaso et al.,

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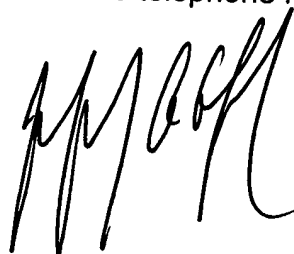
US 6,002,172 Desai et al.,

US 6,222,136 Appelt et al..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy Norris whose telephone number is 703-306-5737. The examiner can normally be reached on Mon.-Th., 9AM - 6:30 PM and alt. Fri. 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 703-308-3301. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7724 for regular communications and 703-305-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

A handwritten signature in black ink, appearing to be 'MMO', is located in the lower right quadrant of the page.

JCSN
August 23, 2001